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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/491,585	01/25/2000	Takuya Noguchi	49543(904)	8721

7590 09/12/2002

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EXAMINER
QI, ZHI QIANG

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/491,585	NOGUCHI ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the c ver sheet with th correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-12 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-12 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2 and 12, recitation "...in a range that no irregular display color appears..." in claim 2 and "...in a range that no display defect occurs" in claim 12 are indefinite. Because the "range" must be a certain quantity of range such as certain distance of the cell gap in the center, and recitation "in a range that no irregular display color appears" in claim 2 and "in a range that no display defect occurs" in claim 12 are only given results, but it cannot tell what is the range. Recitation "it is possible to smooth out a difference in thermal expansion amount between said liquid crystal and said sealing material at a high temperature" in claim 2 are only given a possibility, but it cannot tell what is the structure in the liquid crystal display device. For examination purpose, it is interpreted that the center of the cell gap is smaller than the end of the display area.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,323,929 (Hirakata) in view of Applicant admitted prior art.

Claims 1, 2 and 12, Hirakata discloses (col.2, lines 9 – 14; Fig.3) that a pair of substrates (201) bonded by the sealing material (21) and the Fig.3 shows that the liquid crystal (22) is interposed and maintained between the pair of the substrates (201), and the cell gap (d) is small at the center part (203) of the liquid crystal panel.

Hirakata does not disclose that a cell gap is formed so as to gradually increase from a center to an end of a display area at room temperature.

However, Hirakate discloses a structure of a liquid crystal cell in which the cell gap (d) is small at the center part (203) of the liquid crystal panel. Although the cell gap (d) is small at the center part (203), but that is a kind of gradual increase from the center to an end of the display area.

Applicant admitted prior art discloses (page 4, line18 – page 6, line 4; Figs. 13-14) that the coefficient of thermal expansion of a liquid crystal (53) is larger by one digit than that of a sealing material (54), so that an expansion amount of the liquid crystal (53) is larger than that of the sealing material (54), and consequently, the center of the liquid crystal cell expands upward and downward, and the cell gap results in an irregular display color. According to this principle, to overcome this kind of upward and downward expansion of the liquid crystal material so as to maintain a uniform cell gap at higher

atmospheric temperature, those skilled in the art would use a contrary compensation for the thermal expansion to form the cell gap gradually increase from the center to the end of the display area at room temperature, so that the liquid crystal material would expanse downward and upward to compensate the thermal expansion effect at the higher atmospheric temperature, therefore, maintaining a uniform cell gap at a higher atmospheric temperature.

Therefore, it would have been obvious to those skilled in the art to arrange a cell gap is smaller than the end of the display area and gradually increase from the center to the end of the display area as claimed in claims 1,2 and 12 for achieving a uniform cell gap at a higher atmospheric temperature.

5. Claims 3-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata and Applicant admitted prior art as applied to claims 1, 2 and 12 above, and further in view of US 6,104,467 (Nakahara et al).

Claims 3-4, Nakahara discloses (col.2, lines 19-24) that the accuracy of the cell gap uniformity inside the display region exerted on the display quality is especially significant requiring a surface flatness of not greater than 0.05 μm. Therefore, it would have been obvious to those skilled in the art to set the cell gap in the center part less than an average value of cell gaps on an end at room temperature 0.13 μm or 0.08 μm for achieving the accuracy of the cell gap uniformity.

Claims 5-7, as the explanation of Hirakata and applicant admitted prior art above, those skilled in the art would use a contrary compensation for the thermal expansion to form the cell gap gradually increase from the center to the end of the display area at

room temperature, so that the liquid crystal material would expanse downward and upward to compensate the thermal expansion effect at the higher atmospheric temperature, and maintaining a uniform cell gap at a higher atmospheric temperature; or on the contrary to form the cell gap gradually decrease from the center to the end of the display area at a high temperature, so that the liquid crystal material would expanse downward and upward to compensate the thermal expansion effect at the room temperature, and maintaining a uniform cell gap at room temperature; and that would be depended on the making process, and that would have been an obvious variation.

Therefore, it would have been obvious to those skilled in the art to arrange a cell gap gradually increase or gradually decrease from the center to the end of the display area as claimed in claims 5-7 for achieving a uniform cell gap at a higher atmospheric temperature or at room temperature depending on the making process.

Claim 10, Nakahara discloses (col. 1, lines 6-14) that the super twisted nematic (STN) type liquid crystal display device used as a color display requiring high cell gap accuracy, and that using STN as color display device would have been at least obvious.

6. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata and Applicant admitted prior art as applied to claims 1, 2 and 12 above, and further in view of US 6,104,467 (Nakahara et al) and US 6,327,011 (Kim).

Claims 8-9, Nakahara discloses (col.6, lines 31-32) that the glass substrates are used and plastic substrates also can be used, and that would have been at least obvious. Concerning the thickness of the substrates, Kim discloses (col.3, lines 34-35; col.2, lines 56-63) using thickness less than 0.7 mm for the substrates. If the substrates

were very thin, the substrates would be very easy to be crack. If the substrates were very thick, the liquid crystal display device would get more weight. Therefore, it would have been obvious to those skilled in the art to select a proper thickness for the substrate as claimed in claims 8-9 to use 0.55 mm thickness for the substrates.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakahara as applied to claims 1-7, 10 and 12 above, and further in view of Applicant admitted prior art.

Claim 11, Applicant admitted prior art discloses (col.2, line 1-3) the operating temperature of the liquid crystal display device generally needs to be set between –20 and 70° C in view of using outdoor or in an automobile. Therefore, it would have been obvious to those skilled in the art to set the operating temperature ranges virtually between –20 and 70° C as claimed in claim 11 for the outdoor using or automobile using.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703) 308-6213. The examiner can normally be reached on 349.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Sikes can be reached on (703) 308-4842. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 308-7721 for regular communications and (703) 308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mike Qi
August 12, 2002

TOAN TON
PRIMARY EXAMINER